

tively nearby low population density regions in centrally located desert or outback regions, inhibited user classes may be pre-determined. Another example would be along the East Coast of the United States, a high population density region. Satellite communication system 10 can initially determine inhibited user classes from cells/antenna foot-prints that are projected over the land area.

FIG. 7 illustrates acquisition procedure 100 performed by subscriber unit 26 each time when access to system 10 is desired. When a user desires to initiate a communication, the user may initiate a request for service 102. This may be accomplished by either switching on the subscriber unit or dialing a desired phone number. Task 104 commands subscriber unit 26 to select an antenna beam 35 (FIG. 3) of satellite 12 with the strongest RF signal. Depending on the type of service requested, subscriber unit 26 may temporarily alter its class identifier according to task 106. For example, when a subscriber with a class identifier of "15" (see table I) requests emergency service 107, by dialing 911 for example, the subscriber unit's class identifier may be temporarily changed from "15" to "3". This temporary user class change gives the subscriber unit priority over all other subscriber units with a higher user class identifier. Once an antenna beam 35 is selected, task 108 monitors broadcast channel 18, and, among other things, receives from satellite 12 the list of user classes currently inhibited in the selected antenna beam 35. Subscriber unit 26 also receives from satellite 12 information describing which channels have been assigned as acquisition channels. If there are no inhibited class identifiers determined in task 110, task 112 selects the present antenna beam. If there are inhibited classes, task 114 compares the list of inhibited classes with the user class which has been assigned to the subscriber unit and determines if the subscriber contains one of the inhibited classes. If the subscriber unit is not one of the inhibited classes, task 112 selects the present antenna beam.

If subscriber unit's class is one of the inhibited set of classes, task 116 determines if other antenna beams from satellite 12 are available. Task 116 may base the decision on the adequacy of the signal strength of other antenna beams. If no other antenna beams are available, task 120 displays a message to the user to initiate communications at a later time. Examples of such messages may also include "system busy" messages and "try again later" messages. If other antenna beams are available and can be received by subscriber unit 26, task 118 selects another available antenna beam from satellite 12. Tasks 108 through 120 are repeated for each available antenna beam.

Once an antenna beam is finally selected by task 112, task 122 selects an acquisition channel 19 and initiates an access protocol on the selected acquisition channel. Satellite 12 desirably provides information on what frequencies and/or frequency channels the acquisition channels are located for the particular antenna beam as part of information broadcasted on the broadcast channel associated with that particular antenna beam. In a preferred embodiment, the subscriber unit initiates a Slotted ALOHA protocol on the selected acquisition channel. Upon successful completion of an access protocol, satellite 12 assigns subscriber unit 26 a traffic channel 17 (if a traffic channel is available) in task 126 on which subscriber unit 26 may then communicate with system 10.

In a preferred embodiment of procedure 100, subscriber unit 26 may continually perform tasks 106 through 120 by continually monitoring broadcast channel 18 of antenna beam 35 and inform the user when subscriber unit 26 is inhibited or not inhibited from accessing system 10.

FIG. 8 illustrates procedure 200 performed by control station 65 (FIG. 5) suitable for use in a preferred embodiment of the present invention. Desirably, procedure 200 is performed by control station 65 on a regular basis, and is preferably repeated every planning interval. Planning intervals may range from as short as a few seconds to as long as several hours, and are desirably between fifteen seconds and five minutes and preferably about thirty seconds. Task 202 uses historical loading information 204 to determine geographic areas that are likely to exhibit overload. Preferably, task 202 makes this determination for the current planning interval. Historical loading information may be stored in storage medium 62 (FIG. 5). Task 206 adds geographical areas expected to exhibit overload based on input from a system operator 208. Such input may include human knowledge of unusual events such as natural disasters, major events (e.g., Olympic games) etc. Task 210 will then determine a proportion of subscriber units in the geographic area expected to exhibit overload, to be blocked from attempting acquisition to system 10. This determination will desirably use subscriber database information 214 for the particular geographic location.

Task 216 will determine the specific set of class identifiers (see table I) to inhibit during the present planning interval. The selection of class identifiers to inhibit is desirably shared fairly among all subscriber classes over several planning intervals. For example, if it is necessary to inhibit only one user class of regular subscribers, subscribers assigned class identifier "13" would be inhibited one planning interval, then the next planning interval, subscribers assigned class identifier "14" would be inhibited, until all regular subscriber unit classes are inhibited before inhibiting class "13" again.

Task 218 determines the specific satellite 12 (FIG. 2) and associated antenna beams 35 (FIG. 3) expected to service the overloaded areas during the planning interval. Task 220 generates a list of inhibited classes to be included with the parameter list for the associated antenna beam. Task 222 sends the list of inhibited user classes to the specific satellite 12 for broadcast in the associated antenna beam 35 during the planning interval. Task 224 desirably waits until the next planning interval to repeat procedure 200.

FIG. 9 illustrates procedure 300 performed by a communication node (for example, satellite 12 of FIG. 1) in a preferred embodiment of the present invention. Desirably, procedure 300 is performed once for each planning interval previously discussed. In task 301, the communication node receives a parameter set from the communication system. The parameter set desirably includes a list of inhibited user classes. In a preferred embodiment, the parameter set is generated, at least in part by procedure 200 (FIG. 8). Task 302 determines if satellite 12 is in a maintenance mode (e.g., not accepting calls from subscriber units) and if so, task 304 modifies the parameter set to include all user classes except those assigned the user class of system test and maintenance (see Table I). A maintenance mode can be initiated by sending a specific parameter set to satellite 12 by SCS 28. In a maintenance mode, all users are desirably prohibited from accessing satellite 12. If satellite 12 is not in a maintenance mode, task 306 determines if antenna beam 35 (FIG. 3) is scheduled to be turned off. If so, task 308 modifies the parameter set to include all user classes. Preferably, task 306 determines if the antenna beam is scheduled to be turned off within 15 seconds. If the antenna beam is not scheduled for turn off, task 310 determines if the number of available traffic channels is below a predetermined threshold (for example, 10%). If below the threshold, task 312 modifies the